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Agence spatiale européenne

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Rubrique :

Pge : 32,36

1/4



Le Cnes enterre les ovnis

Le Sepra disparaît. Ce service du Cnes chargé de collecter les témoignages sur les ovnis a toujours été controversé. Son bilan scientifique semble bien maigre. Incompétence, accusent ses détracteurs. Manque de moyens, répond son directeur. Mais qu'y a-t-il vraiment dans les 6 000 dossiers de phénomènes étranges accumulés depuis 27 ans ?

Jean-François Haït

LE Service d'expertise des phénomènes rares aérospatiaux, ou Sepra, est un minuscule service au sein du Cnes, hébergé par le centre spatial de Toulouse. L'agence française, qui connaît depuis deux ans d'importantes réformes, a décidé de le supprimer. L'information pourrait paraître anecdotique, mais la taille du Sepra est inversement proportionnelle à sa notoriété : il est l'organisme officiel qui traite en France les cas de PAN, les Phénomènes aérospatiaux non identifiés. Une terminologie vague utilisée par le Cnes pour masquer un sujet tabou : les ovnis. L'évocation du Sepra, qui se résume à une seule personne, son directeur Jean-Jacques Velasco, a toujours suscité une gêne au sein de l'agence. Une activité en baisse continue et les prises de position de Jean-Jacques Velasco expliquent sans doute sa disparition. Aujourd'hui, plusieurs questions se posent. En 27 ans d'existence, qu'ont fait réellement le Sepra et son prédécesseur le Gépan (Groupe d'étude des phénomènes aérospatiaux non identifiés), financés par le contribuable ? Que contiennent exactement les archives accumulées ? Pourra-t-on un jour les expertiser en toute sérénité ?

Le rôle du Sepra est d'abord de collecter tous les éléments relatifs aux PAN : des témoignages de pilotes civils et militaires, ou de simples citoyens, recueillis par la gendarmerie. Cette dernière doit en

référer au Sepra pour tous les cas de ce type. "Les rapports contiennent le récit des

faits, des données sur l'environnement, la météo, mais aussi des informations sur les témoins, leur situation sociale et leurs valeurs culturelles", explique Jean-Jacques Velasco. À charge ensuite pour le Sepra d'expertiser les cas, en se rendant le cas échéant sur le terrain, et de les classer en plusieurs catégories. Des PAN A, phénomènes parfaitement identifiés (prendre un ballon sonde ou la Lune basse sur l'horizon pour un ovni sont des méprises classiques), aux PAN D, qui constituent quelques pour cent des cas, des événements apparemment réfractaires à toute explication. Il n'est pas dans les attributions du Sepra d'interpréter ces derniers.

Les choses se compliquent lorsque Jean-Jacques Velasco affirme, dans le livre *Ovnis, l'évidence* qu'il vient de publier aux éditions Carnot : "*Je suis persuadé que des dizaines de dossiers classés PAN D constituent des observations d'ovnis extraterrestres.*" Cette hypothèse était déjà présente dans l'ouvrage *Ovnis, la science avance*, qu'il avait cosigné en 1993 avec le très médiatique présentateur ufologue⁽¹⁾ Jean-Claude Bourret⁽²⁾. Désormais, il pousse plus loin sa réflexion en se basant sur des dossiers provenant du Sepra mais surtout des États-Unis. On lit à la fin d'*Ovnis, l'évidence* : "*Des objets volants non identifiés évoluent dans nos parages terrestres. [...] Leur degré de technologie est supérieur à tout ce que l'homme a pu concevoir sur la Terre. Une corrélation indiscutable existe entre leurs manifestations, nos essais et nos sites nucléaires*⁽³⁾."*Cette fois, c'en est trop pour le Cnes : "Aucun des cas collectés par le Sepra ne permet de valider une hypothèse non rationnelle. Nous ne cautionnons aucune*

interprétation. Ce livre ne nous engage pas", martèle Arnaud Benedetti, directeur de la communication de l'agence française.

Depuis le début, le sujet sent le soufre. C'est en 1977 qu'est créé, au sein du Cnes, le Gépan, à l'initiative de Claude Poher,

ingénieur de l'agence qui s'est passionné pour le sujet lors d'un voyage aux États-Unis. Le phénomène ovni y est apparu au lendemain de la Seconde Guerre mondiale, en pleine montée de la guerre froide. Claude Poher étudie la question à titre privé, puis convainc le Cnes de constituer un "guichet unique" pour recueillir et centraliser les témoignages de PAN en France.

Hubert Curien, futur ministre de la Recherche et alors président du Cnes, accepte : "À cette époque, on avait en France beaucoup de témoignages de phénomènes inexplicables attribués à l'arrivée d'engins extraterrestres. Je n'y croyais pas, mais j'estimais qu'il fallait écouter les gens. Sinon, ils deviennent vite des détracteurs de la science." Il va même diriger le conseil scientifique du Gépan. Première bizarrie : on ne peut révéler le nom de ses membres, dont certains sont des "scientifiques de haut niveau". "Je leur avais promis l'anonymat, pour qu'il ne soient pas mis en cause par des gens déçus qu'ils ne valident pas une croyance populaire, mais aussi par certains de leurs collègues, justifie Hubert Curien. C'était la condition de leur coopération." Il est vrai que dans la communauté scientifique, la fréquentation des ovnis, même de loin, est particulièrement mal vue.

Rubrique :	Pge : 32,36
	2/4

C'est donc un comité scientifique anonyme qui valide la méthodologie du recueil des témoignages et des enquêtes sur le terrain concernant les PAN. L'activité débute sous de bons auspices. Jusqu'à sept personnes travailleront régulièrement pour le Gépan, qui compte aussi de multiples collaborateurs occasionnels. Mais au bout de deux ans, Claude Poher quitte ses fonctions. Pour raison personnelle, car il souhaite prendre un congé sabbatique, mais aussi furieux que le comité scientifique lui *"interdise de publier"*. Le Cnes a-t-il déjà peur des interprétations : *"Cela faisait partie du contrat, souligne Hubert Curien. Nous ne souhaitions pas publier pour ne pas entrer dans des polémiques publiques. Conséquence inévitable, le Gépan y a gagné une aura de mystère."* Pourtant, affirme Claude Poher, *"l'hypothèse extraterrestre était à l'époque une parmi d'autres"*. Lui est convaincu de leur existence. Au point qu'il a publié en 2003 *Universons, l'énergie du futur* (éditions du Rocher), une nouvelle théorie de la gravitation qui fournirait une énergie inépuisable pour les voyages interstellaires, qu'utilisent déjà les extraterrestres pour nous rendre visite à l'occasion...

Le polytechnicien Alain Esterle prend la relève. Il restera en fonction de 1979 à 1983. Les enquêtes se poursuivent, et le service diffuse même quelques "notes techniques", des documents traitant surtout de problèmes méthodologiques. Soucis financiers, résultats peu probants, pressions internes ? Toujours est-il qu'à compter de 1983, le Cnes réduit les moyens consacrés au Gépan. Cinq ans plus tard, il devient le Sepra, le Service d'expertise des phénomènes de rentrées atmosphériques. Un sigle qui se révélera à géométrie variable... Le service est chargé aussi bien des cas de PAN que du suivi des engins spatiaux

retombant sur Terre. A sa tête, Jean-Jacques Velasco, un technicien en optique devenu ingénieur maison au Cnes, qui a débuté au Gépan et le dirigeait depuis 1983. Rapide-ment, il devient pour les médias et le public le "monsieur ovnis" du Cnes. Et s'attire des critiques, *"aussi bien des ufologues que des rationalistes"*, souligne-t-il. Les plus radicaux des premiers, intimement convaincus de l'existence des extraterrestres au point de se passer d'observations, le trouvent trop sceptique. Et les seconds n'ont de cesse de dénoncer un fonctionnement du Sepra qu'ils estiment fort peu rigoureux sur le plan scientifique.

Notamment lors des rentrées atmosphériques du 5 novembre 1990. Ce jour-là, de nombreux témoignages font état de phénomènes lumineux au-dessus de la France. Un observateur amateur confirmé les attribuera très vite à la désintégration dans l'atmosphère d'un premier étage de fusée russe Proton, ayant produit de multiples fragments. Mais Jean-Jacques Velasco explique qu'il *"doit attendre les données de la Nasa"*, seule source officielle disposant de radars pour le suivi des rentrées atmosphériques. Dans l'intervalle, son analyse ambiguë des témoignages lui attire des critiques, de même que, plus tard, son interprétation des clichés du phénomène dans les magazines *Paris-Match* et *VSD*, friands d'ovnis. Lui plaide le *"manque de moyens"*. Le Sepra dispose il est vrai d'un budget *"relativement modeste"*, mais qui a pu représenter tout de même jusqu'à 150 000 € annuels.

En 2000, le Cnes retire au Sepra le domaine des rentrées atmosphériques. Il ne s'occupe plus que des PAN et devient le... Sepra, le Service d'expertise des phénomènes rares aérospatiaux. En 2002, Gérard Brachet, le directeur général du Cnes, lance un audit interne du service. *"La situation du Sepra était difficile, et ses relations avec le département de la communication du Cnes étaient mauvaises. Il y avait des pressions au sein de l'agence pour le*

supprimer", explique François Louange, chargé de l'audit. Sa société, Fleximage, spécialisée dans le traitement des images, a déjà travaillé avec le Sepra. Son rapport comprend l'interview de 33 experts d'origine diverse : Cnes, CNRS, militaires, et même journalistes. Ils sont unanimes. Mais il est vrai que la question posée ne mange pas de pain : oui, le Sepra peut poursuivre son activité avec la rigueur scientifique nécessaire, et le Cnes est l'organisme adapté pour cela. En revanche, le rapport n'évalue pas l'efficacité du Sepra, la façon dont les enquêtes sont menées, les résultats obtenus et l'exploitation des données. Il préconise simplement son rattachement à la direction générale du Cnes et une augmentation de son budget.

Cet audit restera lettre morte. Le Sepra continue son activité sans changement notable. Mais celle-ci est de plus en plus réduite. Les PAN auraient-ils déserté le territoire ? *"Il y a eu depuis deux ans une trentaine de cas, dont aucun n'est inexpliqué"*, regrette Jean-Jacques Velasco. L'homme est un passionné, convaincu de l'importance de sa mission. S'il n'a pas démissionné, malgré le peu de soutien dont il dit avoir bénéficié au sein du Cnes, c'est *"pour tous les gens, des secrétaires aux ingénieurs"* qui ont participé à l'aventure. Proche de la retraite, il sou-

haite désormais *"transmettre ce qu'il a appris"*. Et défend le Sepra, comme un *"rempart contre les illuminés, les sectes"* qui exploitent le phénomène ovni... Un rempart qui, de toute évidence, ne joue plus son rôle pour le Cnes.

Le Sepra disparu, que va devenir l'activité PAN dans les prochaines années ? Elle ne sera peut-être pas complètement supprimée, *"car il est difficile de rompre les conventions passées avec la gendarmerie ou l'armée de l'air, qui fournissent des témoignages sur les PAN"*, affirme François Louange. *"Une activité de veille et de récolte des témoignages n'est pas choquante si elle est effectuée avec sérieux."*

Rubrique :	Pge : 32,36
	3/4

Si nous la maintenons, il faudra réfléchir à sa position au sein du Cnes ou en dehors. On peut par exemple imaginer un partenariat entre le Cnes, Météo France et l'armée de l'air", explique Arnaud Benedetti. Quant aux archives du Sepra, elles restent entourées d'un épais mystère. Elles contiendraient aujourd'hui près de 6000 dossiers de PAN, dont une vraie évaluation par des experts indépendants est aujourd'hui nécessaire. "L'ouverture des archives devrait être possible rapidement, dès lors qu'elles auront été rendues anonymes, car elles impliquent des personnes", souligne Arnaud Benedetti. Il n'est cependant pas

certain que les scientifiques se précipitent. Ce n'était déjà pas le cas pour le Gépan. "Je ne crois pas que le Gépan ait apporté un plus à la science. Les données n'ont guère été exploitées. Mais il a certainement permis une détente et apporté la satisfaction d'un service rendu", souligne Hubert Curien. Le Gépan, puis le Sepra n'auraient donc servi qu'à calmer l'opinion ? En 27 ans d'existence, il semble que pas une publication dans une revue scientifique à comité de lecture ne s'est basée sur les données recueillies par ces deux services.

L'exploitation des archives du Sepra impliquerait un peu plus d'ouverture d'esprit de la part de certains scientifiques, pour qui le sujet reste infréquentable. "Les ovnis sont un bon sujet d'étude pour un éventail de disciplines : de la sociologie, la psychologie, à

la physique de l'atmosphère", souligne le sociologue Pierre Lagrange⁽⁴⁾, spécialiste du milieu ufologique. Et sur le terrain, pourquoi ne pas faire appel à de bons observateurs, comme les astronomes amateurs ?" Mais de toute évidence, pour les politiques comme pour les chercheurs, les ovnis sont aujourd'hui loin d'être une priorité. ●

(1) Un ufologue est une personne qui s'intéresse aux ovnis.

(2) Ovnis, la science avance, éditions Robert Laffont, 1993. Du même auteur : Le nouveau défi des ovnis, Ovnis 1999 le contact.

(3) J.-J. Velasco compare le nombre de cas de PAN et celui d'essais nucléaires souterrains et atmosphériques effectués, sur une période comprise entre 1945 et 2000. Il en déduit que les extraterrestres surveillent nos essais nucléaires.

(4) Pierre Lagrange a publié notamment La rumeur de Roswell (éditions La Découverte).





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Sciences-espace-Mars-Europe-ESA

Perte de Beagle 2: aboutissement d'une mission mal organisée (scientifique)

LONDRES, 24 mai (AFP) - La perte du robot Beagle 2, largué sur Mars en décembre 2003 pour y chercher des traces de vie et qui n'a jamais émis de signal, est l'aboutissement d'une mission mal organisée, a affirmé un responsable de l'Agence spatiale européenne (ESA) lundi à Londres.

Selon Colin Pillinger, le concepteur de Beagle 2, la cause la plus probable de la destruction de l'engin est une tempête de sable.

estimé toutefois que l'enquête n'avait pas permis de mettre en cause un événement ou une décision en particulier.

La mission se présentait si mal avant même le lancement que le Pr Southwood s'était demandé, à son arrivée à son poste à l'été 2001, s'il n'aurait pas mieux fallu l'annuler, a-t-il révélé lors d'une conférence de presse.

'L'échec a été institutionnel, a regretté le scientifique: nous travaillions dans un système qui n'était pas bon, où les structures de l'organisation n'étaient pas bonnes et dans lequel les gens n'avaient pas le bon niveau d'autonomie, d'autorité ou de ressource'.

Beagle 2 devait se poser sur la planète rouge le jour de Noël 2003. Mais aucun télescope au sol, ni Mars-Express, la sonde qui l'avait transporté, ni la sonde américaine Mars Odyssey n'ont capté le moindre signal radio de sa part. L'ESA l'a déclaré officiellement perdu le 11 février.

Le système d'atterrissement du robot n'a pu opérer en raison d'une tempête de sable, a expliqué Colin Pillinger, le 'père' du robot.

Selon lui, les tempêtes de sable ont réchauffé l'atmosphère de Mars, diminuant sa densité.

'Quand l'atmosphère est plus fine, a-t-il poursuivi, tout se déclenche plus tard', laissant entendre que les parachutes et les airbags devant ralentir et sécuriser la chute de Beagle 2 ont pu se déployer trop tard, voire pas du tout.

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LE FIGARO

Rubrique :	Pge : 23	
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	1/1	

MARS

L'échec de Beagle : des erreurs de gestion

L'enquête officielle sur l'échec du projet Beagle, ce petit robot britannique, qui devait se poser sur Mars dans le cadre de la Mission Mars Express et dont on a perdu toute trace après sa séparation du vaisseau spatial mi-décembre 2003, a conclu à des erreurs de gestion. La commission d'enquête sur Beagle 2, mise sur pied par l'Agence spatiale européenne (ESA) et le British National Space Center (BNSC) n'a aucune explication technique précise à donner à cet échec, mais a présenté hier 19 recommandations pour l'avenir. Selon elle, le développement de ce type de projets devrait intervenir davantage en amont, afin d'avoir le temps de procéder à davantage de tests préalables. Surtout, tout instrument complexe d'atterrissement devrait être conçu par la même équipe que celle de la mission spatiale.

Rubrique :	Pge : 8	
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Beagle loss a mystery as report suppressed

By Mark Henderson
Science Correspondent

THE Government and the European Space Agency were accused yesterday of an unnecessary cover-up that would damage British science after they refused to publish their inquiry into the loss of the *Beagle 2* Mars lander.

The full report into the £45 million project, £22.5 million of which came from British taxpayers, has been suppressed by ministers and space agency officials because of concern about the commercial confidentiality of private contractors.

The decision to release only the inquiry's 19 recommendations, without any details of the panel's deliberations or conclusions, has angered *Beagle 2* scientists and MPs, who said that the public had a right to know how its money had been spent.

Such secrecy would jeopardise popular support for future missions, they said, and hinder attempts to learn the lessons of the spacecraft's failure.

"We simply cannot tell how suspect or robust these recom-

mendations are if we aren't told how they were reached," one senior team member said. "We need to follow up these conclusions with proper informed discussions. Just because they have been published doesn't mean they're right." None of the scientists involved in the project has seen the report, and the space agency has offered them only a "confidential debriefing". Many said that they feared the lack of disclosure would lead to unfair speculation about who had been most heavily blamed for *Beagle 2*'s failure.

The eight-page summary released after the three-month investigation does not point the finger at any individual, or single out the likeliest reason for *Beagle 2*'s loss. Instead it highlights several aspects of the mission's management, financing and design that contributed to its failure.

Key recommendations include that funding be secured at the outset, that there be no attempt to raise money from private sponsors, and that projects are managed by space

agencies rather than scientists.

Lord Sainsbury of Turville, the Science Minister, said that the investigation he commissioned with the space agency from René Bonnefoy, its inspector-general, was never meant to be published in full.

"It's complicated to release such a report," he said. "It was an internal inquiry, not a public inquiry, and we could only issue it with the agreement of all its participants. It should not be treated as a public inquiry as it was not structured in that way."

David Southwood, the space agency's director of science, said: "You have got to have a certain caution about how one releases information afterwards, about whose intellectual property rights are involved."

Private companies involved in the project said, however, that they would not have objected to publication if commercially sensitive details had been edited out, but that they had not been approached about this.

"It is possible that there is something in it we wouldn't want in the public domain, but

we don't know because they haven't asked us," an executive with one big contractor said.

Colin Pillinger, the mission leader, said that he would have preferred the full report to have been published, though he did not criticise the space agency or the Government.

"The report isn't mine," he said. "It belongs to Lord Sainsbury and [the space agency] and we work by their rules. My attitude to the whole pro-

gramme has been that I'm trying to engage folk by letting them see inside a space programme for the first time. If you show real science in action you'll appeal to people. If you show edited highlights you won't get anywhere. My policy has always been total openness."

Ian Gibson, the Labour chairman of the Commons Select Committee on Science and Technology, said that it would be calling Lord Sainsbury to explain the "quite disgraceful" decision to keep the report secret. "The taxpayer paid for much of this, and we need to know where that money has gone," he said.

SPACEDAILY

Rubrique :	Pge : 1	
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Beagle 2 Mars Lander Doomed From The Start

London (AFP) May 23, 2004

Beagle 2, the European space probe lost shortly before it landed on Mars late last year, was doomed from the start of its mission due to a lack of testing and money, a report said on Sunday.

The mission was a failure waiting to happen, according to a joint report by the European Space Agency, or ESA, and British National Space Centre, The Sunday Telegraph reported.

The inquiry is set to blame the project's managers as well as a lack of testing, and time and money shortages, the paper said.

While he is not named directly, the findings are likely to be seen as critical of Professor Colin Pillinger, the British scientist who masterminded the mission.

The miniature laboratory, built with the goal of searching for signs of life on Mars, had been due to land on the Red Planet on December 25 last year but disappeared without trace.

Scientists assume the craft -- which was meant to flip open on arrival -- may have been destroyed, failed to open properly or else landed inside a crater, making communication impossible. It was officially declared lost in February.

In contrast, a pair of US probes sent to Mars around the same time landed perfectly and have been sending back streams of data ever since.

The Daily Telegraph

Rubrique :	Pge : 4	
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'If we go back to Mars, we must master this technology'

IF the 19 findings from the inquiry report are accepted, another eccentric, "seat of the pants" space mission such as Beagle 2 could never happen again with public money.

The report said future missions should be better planned, more securely funded, have more scope for accidents and be more formally controlled by European space chiefs.

The Commission of Inquiry on Beagle 2, jointly set up in February by the European Space Agency and the British National Space Centre, interviewed scientists involved in the ill-fated British mission, and reviewed its design and management.

The original design for Beagle 2 was scribbled on a beermat by the mission manager, Dr Mark Sims, of Leicester University. The probe, about the size of a garden

barbecue, was built by scientists from the Open University, Leicester University and Astrium EADS. It was last seen shortly before Christmas when it was ejected by the ESA's Mars Express probe.

After entering Mars's atmosphere on Christmas morning, it should have been slowed by two parachutes and then dropped to the surface where inflatable gas bags should have cushioned its fall. It

was designed to open and begin the search for life.

The report was unable to say why it did not make contact. Prof David Southwood, the ESA's head of science, said its parachutes or air bags may have failed.

The protective heat shell may have become tangled with the parachute, or the probe could have become trapped by its airbags and parachute on the surface, he said.

The bulk of the report focused on the better management of future missions and called for decisions to be made far earlier. Beagle 2 was a late "add on" to the Mars Express programme. Because of time pressures, there was insufficient testing of equipment, parachutes and air bags. "If we are going back to Mars, the way to go back is to walk before we run and master this type of technology," said Prof Southwood.

"In Europe we need to have our own mastery of entry, descent and landing systems."

Future landers should carry a transmitter that would allow their descent to be monitored, it said.

The planning problems were compounded by the way Beagle 2 had to chase funding.

"The creative approach to financing used by Beagle 2 was probably a step too far," said Prof

Southwood.

High-risk missions should never have to seek sponsorship from commercial companies like Beagle 2 tried to do, but should have public funding, he added.

The report implied that scientists, politicians and space officials may have "talked up" the chances of success – even though two thirds of Mars missions fail.

Expectations of future missions should be managed in a "balanced and objective way to prepare for both success and failure", the summary said.

The Beagle 2 team believe unprecedented Martian weather may have been to blame. Unusual dust storms before Christmas may have warmed the atmosphere, making it thinner than usual. As a result, Beagle 2's parachutes may have deployed too late, he said.

Despite the criticisms, Prof Pilling urged the ESA and the Government to back another Beagle mission, at a cost of £100 million.

"We gave Beagle the very best shot we could within the constraints that were placed upon us," he said. "We were right to have a go."

Rubrique :	Pge : 6	
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Beagle inquiry hints at return to Mars

Secret inquest on lander loss lifts hopes of relaunch

Tim Radford Science editor

A secret inquest into the loss of Britain's Martian lander Beagle 2 has ended with 19 recommendations for the European Space Agency — and a hint that a Beagle 3 might return to Mars under European colours.

The tiny space probe was the only robot so far designed to look specifically for signs of life on the Red Planet. It hitched a ride on Europe's Mars Express satellite, and separated from the mother-ship on December 19. It almost certainly landed on Mars on Christmas Day, but sent no signal back. In February, scientists and engineers accepted that their mission was lost.

Only four copies of the independent inquiry have been printed, and its text remains confidential because so many commercial businesses backed the Beagle consortium. But the space agency yesterday published its recommendations, with a promise of a return to

Mars under its much-debated Aurora programme.

"I am sure we will go back to Mars and we need to look at the best way of doing this and I hope something like Beagle would be part of that," said Lord Sainsbury, Britain's science minister.

"If you are going to Mars, astrobiology is the most exciting question to try and answer. I think therefore you can take it that looking for life on Mars, or the wherewithal to look for life on Mars, is going to be fundamental in our science priorities," said David Southwood, head of science at the ESA. "Astrobiology came up trumps for a lander once before. You can take it we have to regard it still as a major priority, but I am not going to guarantee precisely how we do it. We need to make decisions fairly rapidly."

But, he said, he wanted more time and more resources to spare on any future Mars mission "to recover the science that we still feel has not been done."

Beagle 2 took its name from the ship that carried Charles Darwin on his celebrated voyage. It was the brainchild of Colin Pillinger of the Open University, who put together a consortium to design and build the little probe, roughly the size of a garden barbecue set, but equipped with a "mole" that could burrow into Martian bedrock and a tiny laboratory that could "cook" rock samples and read chemical signatures.

Altogether, more than 40 UK businesses were involved in funding the project or making the hardware. Its colour calibration chart was painted by the artist Damien Hirst, and its call sign was composed by the band Blur.

Support from both the British government and from the ESA came late in the life of the project. Its total cost was put at £50m; far cheaper than any US Martian project.

But Mars is a tough target. Two thirds of all missions to Mars have ended in failure. The successful Mars Express flight carried European instruments originally designed for the Russian orbiter lost on launch in 1996. The European inquiry pointed to no individual, and no single tech-

nical decision, as a cause of failure. Most of its 19 recommendations are concerned with how the agency should manage and finance future missions; others stress the need for more testing, better equipment, and back up equipment to warn of impending failure.

Beagle 2 may have smashed into the Martian atmosphere and burned up. Its parachute could have failed to open, its airbags could have failed to protect it when it bounced to a standstill, or faulty wiring may have silenced the project.

Beagle 2 hit the thin Martian atmosphere at 13,000 mph and mission scientists favour the theory that a freak thinning of the atmosphere meant that all their calculations were wrong: the lander would have made its descent at too great a speed. But they will probably never know.

Many in the team would like to try again. With a quick decision, Beagle 3 could be ready for a 2007 launch.

Rubrique :	Pge : 18
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To infinity and beyond: we should support Beagle 3

RICHARD
HOLLINGHAM

YOU could almost sense the glow of self-satisfaction diffusing through the European Space Agency (ESA) yesterday as it published its report into the vanishing of the *Beagle 2* spacecraft. For months its scientists and bureaucrats have been waiting for the moment to say, "I told you so" to the team behind Britain's contribution to the *Mars Express* mission. It's a pевish attitude that permeates right to the top of the agency, where even David Southwood, its Director of Science, had made no secret of his disdain for *Beagle 2*.

From its conception in 1997, when Colin Pillinger first sketched out a design for the craft on the back of a beer mat, it had always existed on a knife-edge relying on private sponsors, benevolent industries and, eventually, a reluctant Government for support. Even when ESA finally accepted the *Beagle* lander, its officials took the opportunity to block and bad-mouth it at every turn, with many murmurings about Professor Pillinger's shortcomings as a project leader.

But, in the face of bureaucratic negativity, Pillinger's tightly knit team managed to scrape the money together to conceive, build and test *Beagle 2* in a remarkably short space of time.

His grudging support from ESA rather reflects Britain's unduly marginal role in space research. Although we have got some of the

best scientists, we remain very much on the periphery of the great European space project. Even the Netherlands, hardly a country associated with interstellar travel, has put an astronaut into orbit. The UK doesn't contribute at all to the human spaceflight programme. The (British-born) American, Michael Foale, remains the closest we've got to a Brit in space.

IN DEVELOPING *Beagle 2*, Pillinger ruffled a lot of Eurocratic feathers and this is reflected in the recommendations from the commission of inquiry. The perception is that *Beagle* was a bit of a rush job led by a maverick with little regard to central control. But what really lies behind that is a failure by ESA officials and the British Government to give the project the backing it deserved, at the moments it needed it.

No one knows, perhaps never will, what became of the lander — whether it burnt up on entry to the Martian atmosphere or crash-landed inside a crater — but mistakes were certainly made. Not least in the testing; this probably should and could have been far more vigorous. But if ministers had been less parsimonious and ESA had taken Pillinger more seriously, then he could have spent less time fundraising and more time testing the spacecraft.

However, you can bet that had it worked, then everyone from the Prime Minister to the ESA science

director would be congratulating themselves on having the sense and vision to back the project. As it is, Pillinger's team will shoulder the blame for another "great British failure".

But at £50 million has it really failed? Not only did the scientists have to develop new and innovative technologies that can be applied again, but the financially precarious nature of the project meant that they also had to seek publicity. By roping in the likes of Damien Hirst and Blur, Pillinger's dogged determination galvanised national interest — particularly among the younger generation for whom the Moon landings are just another page in the history books.

In December last year, Lord Sainsbury of Turville, the Science Minister, pledged to back a *Beagle 3* mission. He's been as quiet as the missing space vehicle ever since. The Government should start taking space exploration seriously, rather than just talking the talk. It needs to beef up the relatively insignificant British National Space Centre and put up the money for a new mission. Led, of course, by Colin Pillinger.

Richard Hollingham is a science writer and the co-author of *How to Clone the Perfect Blonde*

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Article/Internet	1/1	

Europe learns from Mars failure

Overlooked risks and tight budget contributed failure of Beagle 2

LONDON, England (AP) -- An official investigation into Europe's doomed mission to Mars delivered veiled criticisms of the ambitious project on Monday by recommending better management and funding of any future ventures to the Red Planet.

Science Minister Lord Sainsbury said that no single technical failure or shortcoming was to blame for the failure of Europe's first attempt to land a probe on Mars but suggested that scientists had overestimated the success of the mission.

"It's now clear that the very high potential scientific benefits of the project may have contributed to a collective institutional underestimate of ways to identify and mitigate the risks ... and they proved difficult to resolve due to tight financial and schedule constraints," Sainsbury said.

The British Government and the European Space Agency refused to release the full report they commissioned into the loss of the Beagle 2 Mars lander, issuing instead only a list of recommendations generated from the inquiry.

Sainsbury said the report was kept confidential to protect sensitive commercial interests and ensure no one was afraid to come forward with evidence.

The government plowed more than \$40 million into the British-built Mars lander, which piggybacked a ride to Mars on the back of a European Space Agency orbiter. The rest of the \$80 million came from private companies. Beagle 2 was due to touch down on Mars on Christmas Day but has not been heard from since it was ejected from European Space Agency's Mars Express in mid-December.

The tiny lander was due to spend six months probing and analyzing rocks and soil with its robotic arm, sending back data via the ESA's orbiter.

The report recommendations said future missions should be "well scoped" at an early stage so that they are better able to deal with any problems that might arise in the later stages of a project's development.

Sainsbury said there were difficulties with the treatment of Beagle 2 as an instrument in the Mars Express mission, a standard practice at the time, rather than as an integral part of the spacecraft.

Professor David Southwood, director of space science at ESA, said scientists had learned several lessons from the failure of Beagle 2 and that Europe would continue with its space exploration.

"We were working in a system which wasn't right, where the organizational structures weren't right and people didn't have the right level of empowerment, authority or resource," he said.

"Exploring the solar system is too important to just leave to the Americans and we Europeans have our role to play out there."

Prof. Colin Pillinger, the British scientist who led the mission and wants to return to Mars by 2007, called for the creation of a British space agency such as America's NASA to spearhead future projects.

The fate of Beagle 2 remains unknown despite aerial searches by the U.S. Mars Global Surveyor orbiter and sweeps by Earth-based radio telescopes.

Pillinger said the most likely explanation for the loss of Beagle 2 were turbulent Martian dust storms that preceded the arrival of the lander, heating the atmosphere and making it thinner.

"It was thinner than anticipated," he said. "If the atmosphere is thinner, everything is triggered later."

As a result, Beagle 2's parachutes and the air bags that were designed to cushion its fall would have been deployed too late or not at all.

Other theories include suggestions that Beagle's back shell tangled with the parachute, preventing it from opening properly, or that it became wrapped up in its air bags or parachute on the surface and could not open. Southwood said the mystery may one day be solved, and hopefully by Europeans.

"You never know, one day in the future, Europeans walking across the surface of Mars will find Beagle," he said.

Rubrique :	Pge : 4	
	1/1	

Public still in dark over Beagle

BY DAVID DERBYSHIRE
SCIENCE CORRESPONDENT

THE Government and European space chiefs yesterday refused to publish the full report into the loss of the Beagle 2 Mars probe, even though British taxpayers contributed more than £22 million to the cost of the mission.

The decision, justified on grounds that the report contained "commercially sensitive" information, led some scientists to accuse the authors of a cover up. Others expressed concerns that the inquiry was rushed and not truly independent.

Beagle 2 was Britain's first interplanetary space mission. Launched last June on board the European Space Agency's Mars Express spacecraft, it was designed to find signs of life on Mars.

From the start, the project was hit by crises. Prof Colin Pillinger, the Open University space scientist who led the team, initially struggled to persuade Europe to give Beagle 2 a ride to Mars and then had problems getting the £45 million funding.

The team faced impossibly tight deadlines and was forced to rely on moonlighting scientists from academia and industry. The project came close to collapse more than once and the finished mission, while technically ingenious, had no room for error.

Beagle 2 was due to land on Christmas Day but failed to make contact despite repeated attempts.

According to a summary of the

report, no individuals or institutions were to blame. Instead, "institutional failings" had led to poor management, inadequate tests, restrictive budgets and too little time.

The reluctance of British and Europe space officials to publish the full report – yesterday they released just the 19 recommendations – contrasts with America's approach to failed missions.

Last year, an inquiry team published a six-volume dossier into the 2003 Columbia shuttle disaster containing severe criticisms of Nasa.

Prof David Southwood, the ESA's director of science, defended the decision, claiming that things were "done differently" in Europe.

"People say that Nasa always publishes," he said. "America's an open society. Open societies have their strengths and weaknesses. We live in an open society too and it's open in a different way."

European space science was not the domain of a single, "specialist agency" but involved private companies. Many had given time and resources to the Beagle 2 mission and some information in the report was commercially sensitive.

Publishing the report would encourage people to look for people to blame, he said.

Lord Sainsbury, the science minister, also defended the decision. The inquiry was set up internally, and was not a public investigation, he said.

"I don't think this adds very much to any public discussion," he said.

The "independent" inquiry was commissioned by the Government and the ESA and was led by René Bonnefoy, the agency's inspector general. Investigators are understood to have spent just 30 minutes interviewing Prof Pillinger about the project.

According to ESA officials just "four or five" copies of the full report exist. None of the scientists directly involved had seen a copy yesterday, although some were told they could be "debriefed" if they wished.

Prof Pillinger was frustrated that the report was not made more widely available.

Other scientists were more openly critical. Prof Andrew Balogh, professor of space physics at Imperial College, London, said: "The principle of not publishing is not helping the cause of preparing for the next Mars mission in Europe. I can't find any argument for justifying it apart from protecting people who perhaps should not be protected."

Lembit Opik, the Liberal Democrat MP and space enthusiast, said he was disappointed with the decision not to publish. "The lessons from Beagle 2 should be public property regardless of how the media might handle the findings," he said.

Rubrique :	Pge : 11	
	1/1	

Beagle fell victim to Martian heatwave, says scientist

BY CHARLES ARTHUR
Technology Editor

BRITAIN'S ILL-FATED Beagle 2 space probe probably fell victim to the wrong kind of weather – a Martian heatwave, the mission's chief scientist said yesterday. Professor Colin Pillinger was speaking as the European Space Agency (ESA) and the British government released 19 recommendations – but not the full report – into the failure of the £50m Beagle 2 project, which was due to land on Mars on Christmas Day to search for signs of life.

The report is being kept confidential, so much so that even Professor Pillinger is not allowed to read it in full, though civil servants said he will receive a "full debrief" on the content relating to the mission itself.

Professor Pillinger said yesterday he believed that turbulent dust storms preceding the arrival of Beagle 2 at its launch site had heated the Martian atmosphere, making it less dense.

That would cause the lander to fall faster and further towards the surface. "It was thinner than anticipated," said Prof Pillinger, of the Open University. "If the atmosphere is thinner, everything is triggered later."

As a result, Beagle 2's parachutes and the airbags that were supposed to cushion its fall would have been deployed too late or not at all, and it would crash on the surface. However, investigators have never been able to pinpoint the definitive cause of the disappearance.

The existence of the report, and its non-disclosure for reasons of "commercial confidence", stirred up a fresh round of controversy between civil servants and Professor Pillinger's team, who launched Beagle 2 from the ESA Mars Express spacecraft after effectively hitching a lift on the mission during planning in 1997.

Professor Pillinger said yesterday: "I'm annoyed that this report has taken so long to come out, and that it was leaked

in a way that would let journalists think it contained criticism of people." The limited circulation of the report suggests only a handful of people would have been able to leak any of its contents ahead of yesterday's unveiling.

The report investigated the processes around Beagle's development and deployment. But only four copies have been produced. David Leadbeater, deputy director-general of the British National Space Centre, and one of those who has had sight of the full report, said that the secrecy was partly because two companies involved in the project are suing each other, which made the report commercially confidential.

"There was a collective failure to appreciate the complexity and difficulty of this exercise," Mr Leadbeater said. But he insisted the report does not apportion blame. "It does not say anywhere that a person or team should or should not have done this or that. It is more concerned with processes."

But the report's recommendations contain coded criticisms of the designs chosen by the Beagle 2 team, especially its

parachutes. By recommending different designs for future landers, and better coordination over the use of airbag technology with the US and Russia, it suggests that the Beagle 2 team failed to make allowances for variations in conditions.

But Professor Pillinger rebuffed those criticisms. "The failure wasn't because the lander hit the parachute as those recommendations suggest," he said yesterday. "It could have been a two-pence resistor failing. We just won't know. There were things we could have done better, but some things were imposed on us."

Rubrique :	Pge : 3	
	1/1	

Mars mission's failure linked to ills of system

European inquiry also cites financing

From news reports

LONDON: Serious organizational failures lie behind the loss of Beagle 2, the European space probe to Mars that vanished shortly before it landed last year, an official inquiry reported Monday.

David Southwood, director of space science at the European Space Agency, said the inquiry had found that "no single event led to failure and no single individual made a bad decision."

"However, failure was institutional," Southwood said in a press conference. "We were working in a system which wasn't right, where the organizational structures weren't right and people didn't have the right level of empowerment, authority or resource," he said at a press conference.

Lord Sainsbury, the science minister, suggested that scientists had overestimated the success of the mission.

"It's now clear that the very high potential scientific benefits of the project may have contributed to a collective institutional underestimate of ways to identify and mitigate the risks," Sainsbury said.

Those problems, he added, proved difficult to resolve because of "tight financial and schedule constraints."

The British government and the European Space Agency refused to re-

lease the full report that they commissioned into the loss of the Beagle 2 Mars lander, issuing instead only a list of recommendations generated from the inquiry.

Sainsbury said the report was kept confidential to protect the commercial interests and to ensure that no one was afraid to come forward with evidence.

The British scientist who was a leading force behind the tiny probe, built with the goal of searching for signs of life on Mars, said that a Martian dust storm was the most likely reason behind its presumed destruction.

The scientist, Colin Pillinger, told the press conference that these unusual atmospheric conditions meant that the landing equipment had failed to operate as planned.

The dust storms heated the Martian atmosphere, making it thinner, Pillinger said.

"It was thinner than anticipated. If the atmosphere is thinner, everything is triggered later," he said.

As a result, the parachutes and air bags meant to break the fall would have been deployed too late or not at all.

Other theories include suggestions that probe's back shell became entangled with the parachute, preventing it from opening properly, or that it became wrapped up in its air bags or para-

chute on the surface and could not open.

Southwood said the mystery may one day be solved and, he hoped, by Europeans.

"You never know, one day in the future, Europeans walking across the surface of Mars will find Beagle," he said.

The miniature laboratory had been scheduled to land on Mars on Dec. 25 last year before flipping open like a pocket watch and beginning its work.

In contrast, a pair of U.S. probes sent to Mars around the same time landed perfectly and have been sending back data.

One of the report's most significant recommendations was that future missions be better integrated between the orbiter craft and the lander.

Beagle 2 was added on to the Mars Express Orbiter that carried it to Mars and was treated as an instrument to be deployed instead of being considered as part of the whole spacecraft.

Beagle 2's budget is secret, but is unofficially estimated about £30 million to £50 million, or \$54 million to \$89 million. That constitutes about one-tenth of the budgeted cost of each of the two American rovers.

(AFP, AP)

Frankfurter Allgemeine

Rubrique :	Page : 9
Deutschland und die Welt	1 / 1

Marsmission ist auch an zuwenig Geld gescheitert

LONDON, 24. Mai (dpa). Schlechtes Management, zuwenig Geld und hoher Zeitdruck sind vermutlich Schuld am Scheitern des europäischen Marslandegerätes „Beagle 2“ im Dezember vergangenen Jahres. Zu diesem Ergebnis kam eine Untersuchungskommission der Europäischen Raumfahrtagentur (ESA) und des Nationalen Britischen Weltraumzentrums. Wie die BBC am Montag berichtete, sei die Veröffentlichung des Berichts nicht vorgesehen, jedoch gehe die Einschätzung über die möglichen Fehler aus Empfehlungen der Kommission zu zukünftigen Projekten hervor. Nach den Angaben sei zu Beginn zuwenig Geld in das 75 Millionen Euro teure Projekt geflossen. Weil der Zeitdruck hoch gewesen sei, seien nicht alle Komponenten vor dem Start ausreichend getestet worden. Dazu gehörten etwa die Luftkissen, die den Aufprall auf der Marsoberfläche abfedern sollten. Der britische Chefwissenschaftler Colin Pillinger wies jede Kritik zurück.

Neue Zürcher Zeitung

Rubrique :	Page : 43
Vermischtes	1 / 1

Managementfehler bei der «Beagle 2»-Mission zum Mars

London, 24. Mai. (ap) In einem offiziellen Untersuchungsbericht ist am Montag versteckte Kritik an der gescheiterten europäischen Marsmission «Beagle 2» geübt worden. In Zukunft sollten derartige Projekte besser geleitet und finanziell ausgestattet werden, hiess es. Die Untersuchung war von der europäischen Raumfahrtbehörde ESA und der britischen Regierung, die sich mit umgerechnet 30 Millionen Euro an der Mission beteiligt hatte, in Auftrag gegeben worden. Verschiedene Firmen hatten außerdem knapp 66 Millionen Euro zu «Beagle 2» beigesteuert.

Der britische Wissenschaftsminister Lord Sainsbury sagte, es gebe keine einzelne Ursache für das Scheitern. Die Wissenschaftler hätten aber die Erfolgssäusichten der Mission überschätzt. Die Risiken seien außerdem aus Zeit- und Kostengründen nicht minimiert worden. Die in Grossbritannien gebaute Marssonde «Beagle 2» hätte eigentlich an Weihnachten 2003 auf dem Roten Planeten landen sollen. Seit sie am 19. Dezember ihren Transporter «Mars Express» verlassen hatte, waren aber keine Signale mehr empfangen worden. Nach Aussage des Forschungsleiters Colin Pillinger könnten heftige Marsstürme vor der Ankunft für den Verlust verantwortlich gewesen sein. Durch sie könne die Atmosphäre aufgeheizt und dünner geworden sein. Wenn die Atmosphäre dünner sei, geschehe alles verzögert. Die schützenden Fallschirme und Luftkissen des Roboters könnten deshalb nicht rechtzeitig oder gar nicht geöffnet worden sein.

EL PAÍS

Rubrique :

Page : 31

1 / 1



‘Beagle-2’, la sonda perdida en Marte, tuvo graves fallos de gestión

La comisión de investigación no ha podido identificar la causa técnica del fracaso

ALICIA RIVERA, Madrid

El programa de la sonda espacial británica *Beagle-2*, que tenía que haber descendido en Marte en diciembre pasado, estuvo plagado de fallos de gestión, según destaca, como principal conclusión, la comisión que ha investigado las causas de su pérdida. Los expertos no han podido identificar un problema técnico único causante del fracaso, pero han hecho una lista de recomendaciones que, indirectamente, señala numerosos y graves fallos en la misión.

El informe de la comisión de expertos es confidencial, para preservar los intereses de las empresas participantes en el *Beagle-2*, y ha sido entregado a los responsables de la Agencia Europea del Espacio (ESA) y al ministro británico de Ciencia e Innovación, Lord Sainsbury. Pero ayer se hicieron públicas en Londres sus recomendaciones.

La *Beagle-2* viajó hasta las proximidades de Marte unida a la nave de la ESA *Mars Express* —que está realizando su misión científica en órbita allí con éxito— y se separó el 19 de diciembre para seguir en solitario. Tenía que haber llegado el 25 de diciembre al suelo marciano, pero no se recibieron señales suyas ni ese día ni durante los repetidos y variados intentos de comunicación. La *Beagle-2*, cuyo objetivo esencial era buscar rastros de actividad biológica en Marte, fue un desarrollo británico añadido a la *Mars Express*, aunque al final la ESA financió parte de su coste, que fue de 75 millones de euros.

Las 19 recomendaciones de la comisión, co-dirigida por René Bonnafoy (ESA) y David Link

los programas, “para proporcionar a todos los participantes los requisitos técnicos del proyecto y suficientes descripciones del diseño”. En las sugerencias técnicas, la comisión dice, por ejemplo, que las sondas deben llevar equipos de comunicación para que en Tierra se sepa qué sucede en ellas. La *Beagle-2* iba sorda y muerta durante la arriesgada maniobra de descenso, de forma que no envió datos que permitieran luego averiguar qué sucedió, ni evitar los mismos fallos en el futuro.

También se dice que deben hacerse suficientes pruebas de los sistemas de una sonda de estas características, incluidos los dispositivos de descenso, como escudos protectores, paracaídas y *airbags*.

El responsable de la *Beagle-2*, Colin Pillinger, dijo ayer que su hipótesis es que la sonda se estrelló debido a que durante la tormenta de arena de diciembre en Marte, la atmósfera era menos densa de lo previsto, de forma que el artefacto descendió a mucha velocidad y los *airbag* y paracaídas no amortiguaron el golpe.

Por esta razón la NASA modificó ligeramente la secuencia de descenso de su robot *Spirit*. Pero aunque esta fuese la causa del fracaso británico, hay que recordar que el *Beagle-2* no tenía medios para recibir desde Tierra órdenes de alterar su maniobra de caída y cumplirlas.

Varias recomendaciones apuntan a que debe haber una financiación adecuada para los proyectos espaciales y un margen para contingencias. La misión actual de la NASA en Marte, con sus robots *Spirit* y *Opportunity*, ha costado 800 millones de dólares.

La décima recomendación se refiere a la necesidad de que haya una documentación completa de

SPACEFLIGHT NOW

Rubrique :	Pge : 1	
Article/Internet	1/1	

Cassini peers closer at Titan

CICLOPS/SPACE SCIENCE NEWS RELEASE

Posted: May 21, 2004

The Cassini orbiter continues its observations of Saturn's mysterious moon Titan, stealing another early peek at the haze-enshrouded surface. Cassini's view of Titan now surpasses Earth-based observations in its ability to show detail.

Titan, Saturn's largest moon, is a prime target for the European-built Huygens probe onboard Cassini. Perpetually enshrouded by a hazy atmosphere, scientists believe Titan may harbor methane seas and organic chemicals, possibly like those on the early Earth. Huygens will be the first probe to descend to the surface of a moon of another planet, and is by far the most distant descent of a robotic probe ever attempted on another object in the solar system.

The Cassini spacecraft was 29.3 million kilometers (18.2 million miles) from Titan on May 5, 2004, when the image on the left was taken through one of the narrow angle camera's spectral filters specifically designed to penetrate the moon's thick atmosphere. The image scale is 176 kilometers (109 miles) per pixel, an improvement in resolution of 30 percent over the images released on May 6.

The image has been magnified 10 times and has been enhanced in contrast to bring out details. The mottled pattern is an artifact of the processing. The larger scale brightness variations are real. No further processing to remove the effects of the overlying atmosphere has been performed.

The superimposed coordinate system grid in the accompanying image on the right illustrates the geographical regions of the moon that are illuminated and visible, as well as the orientation of Titan -- north is up and rotated 25 degrees to the left. The yellow curve marks the position of the boundary between day and night on Titan. This image shows about one quarter of Titan's surface, from 180 to 250 degrees west longitude, and overlaps part of the surface shown in the previous Cassini [image release](#).

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Office of Space Science, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging team is based at the Space Science Institute, Boulder, Colo.

Rubrique :	Pge : 10	
	1/2	

Commuters take heart, it could get a lot easier

By Otto Pohl

BERLIN

Why should busy executives be the only ones who get to reduce their commutes by flying?

"Every time you're caught in traffic, a little piece of your life goes out of the door," said Paul Moller, one of a number of inventors who has taken a hard look at improving the lot of those still stuck in the slow lane.

Moller has created a cross between an airplane and a car. It doesn't need a runway, fits into a one-car garage, and flies 450 kilometers, or 280 miles, an hour while getting gas mileage better than many SUVs.

Moller's Skycar is only one of a number of bold new aviation ideas that could reshape the way the world travels to work. A number of companies are building so-called microjets, which are like today's business jets but smaller and more affordable. Others, hewing closer to the Concorde's vision, have designed planes than can fly from New York to Tokyo in less than an hour.

Of these, the microjets are closest to reaching market. Colorado-based Adam Aircraft expects to deliver the first of these planes by the end of the year. The A700 jet costs \$2 million and can fly four passengers 2,000 kilometers without refueling. The company is also working on a twin-propeller airplane, the A500, which costs \$895,000. According to company officials, thousands have already been ordered.

Currently, entry-level jets cost \$4 million, with larger models costing up to \$40 million. The producers of these tiny new jets hope to not only capture the business of companies that can't af-

ford a larger jet, but also to create a market for air taxis. These taxis would be on call, like regular taxis, and could land at all of the small airports around the world, many of which don't have any regular commercial traffic.

Eclipse Aviation is planning to introduce a jet even cheaper and smaller than the Adam A700, but recent design hurdles have delayed release for several years. The plane, the Eclipse 500, will cost \$1.2 million and carry up to four passengers. It is scheduled for release in 2006.

The established manufacturer, Cessna, is also planning to enter the market. The Cessna Mustang is expected to cost \$2.3 million and carry four passengers.

The primary hurdle that these tiny planes face is an overburdened air traffic control system. In order to accommodate a swarm of tiny planes filling the skies, a new control system needs to be implemented. In the United States, the space agency, NASA, has begun work on a Small Aircraft Transportation System, which will use advanced GPS technology to track planes flying between the country's estimated 5,400 airports.

But tracking planes between a few thousand airports is nothing compared to the challenge presented by Moller's Skycar, which can take off and land on any hard surface. Since there is no pilot on board, it would not only need to be tracked by a central monitoring agency, but steered by it.

Skeptics doubt that there will ever be a system reliable enough to guide that many vehicles safely, but others who have seen the vehicle are convinced that its time will come. Several officials from NASA have seen the vehicle and are convinced that it is only a matter of time before it transforms society.

"Technically, this is a completely vi-

able product," said Moller, who has flown test flights and already pre-sold about 100 of the vehicles. The price is \$750,000, but Moller expects that they will cost about the same as ordinary cars once the vehicle is produced in volume.

At the other end of the spectrum, several research groups intend to revolutionize long-distance travel with new engines that allow for intercontinental flights at rocket speeds. Last year, the Moscow Aviation Institute announced a design for a plane they call the Cosmoplane that would fly out of the Earth's atmosphere at the top of its trajectory.

Ivan Obruchev, a member of the project, said that tests were already under way, and that the plane could be ready in 10 to 15 years. The engines would run on a mix of liquid hydrogen and oxygen and propel the plane at speeds up to 28,000 kilometers an hour. Obruchev said that the Cosmoplane could fly from Moscow to New York in 50 minutes, and New York to Tokyo in only a few minutes more.

In the United States, Alliant Techsystems Inc. is leading a project than intends to produce a plane that could also fly at hypersonic speeds. Called the scramjet, it uses oxygen from the thin upper atmosphere to ignite hydrogen fuel. It could fly at 8,000 kilometers an hour, fast enough to fly from Los Angeles to Sydney in under two hours. But these new supersonic jets won't come cheap. Initial estimates by the Cosmoplane developers indicate that a ticket would cost at least \$16,000.

Otto Pohl is a freelance journalist based in Berlin.

Rubrique :	Pge : 6	
	1/1	

Vanishing act that must rejuvenate hunt for life in the cosmos

Comment

Monica Grady

Beagle 2, the UK-led lander for ESA's first mission to Mars, is the sort of story of which documentary makers dream. A plucky team of engineers and boffins led by an eccentric professor with the oddest facial hair since Brunel; intricate European bureaucracy; insufficient money or time; a goal: to find life on Mars on Christmas Day.

If it were a story, Beagle 2 would have landed on December 25 2004, phoned home, then busied itself rummaging in the Martian soil looking for signs of life. Unfortunately it is a matter of history and not a fairy

story that Beagle 2 declined to send back its arrival message and nothing has been heard from it since.

But this does not make it a failure. It makes it a cautionary tale, one with a moral; a tale which we hope will be

the introduction to an epic saga of European exploration.

In many ways Beagle 2 was a success: its team designed, built and delivered a unique spacecraft on time and on budget. The miniaturised versions of the traditional instruments on board the lander all have potential spin-off applications in other fields and are being developed. The UK has a vibrant space industry with a highly-skilled workforce. The headlines that Beagle 2 made raised the issue of space exploration in a way unprecedented since Neil Arm-

strong took his small step on the lunar surface almost 35

years ago. Beagle 2 has inspired new generations of scientists and engineers, students and children. It has become part of our national consciousness with references to it on quiz shows, comedy programmes, cartoons and crossword puzzles (see cryptic puzzle last Friday, 22 down).

So where do we go from here? The answer is obvious: straight back to Mars. But we don't go under the same circumstances. We go as part of the Inspiration Initiative — ESA's vision of space exploration, travelling through the solar system and beyond, searching for the origins of life. The first stage in this initiative is the Aurora programme, a series of missions to explore Mars. The first real launch prospect for a Mars mission is in 2009, although there is a launch window in 2007. Realistically, that is too soon for even a Beagle 3 based on its predecessor.

Why do we still need to go

to Mars? Hasn't Nasa got it all sewn up? Finding out whether or not we are alone in the solar system is a compelling question which needs answering and the

Aurora programme hopes to do that. And no, Nasa hasn't got it all sewn up. Some of the instruments on board Beagle 2 were world-beaters, and unique to Europe. As part of a strong European initiative, the UK has the chance to lead the Aurora programme, to drive forward its science goals and find out whether there is, or ever has been, life on Mars.

Professor Monica M Grady leads the division of meteorites and cosmic mineralogy at the Natural History Museum, London and is also at University College London

 THE INDEPENDENT

Rubrique :	Pge : 30	
	1/1	

Give the green light for another mission to Mars

FINDING OUT what went wrong is a crucial part of the learning process. It means you avoid making the same mistakes next time. The inquiry by the European Space Agency and the British National Space Centre into why the Beagle 2 mission to Mars went wrong has finished its work, but will not make its report public – only its recommendations. This is a pity because it has led to dark whispers that the report essentially finds Professor Colin Pillinger, the physicist with the eccentric sideburns who became a fixture on our TV screens before Christmas, largely to blame for the mission's failure. We lost contact with Beagle 2 at some point as it descended through the Martian atmosphere on Christmas Day.

From what little we know about the report's content, it talks of "failures of process". It is people who make processes and considering Professor Pillinger was, very obviously, the guiding force behind the whole project, this does seem to be an implicit criticism of his leadership. If this is the conclusion, it seems rather cowardly of the European Space Agency not to make this known. It also seems an overly

harsh judgement on Professor Pillinger.

Professor Pillinger had to demonstrate shrewd entrepreneurial skill to get the mission going – hitching a lift on the *Mars Express* orbiter – and was working to a very tight schedule. Under these conditions it is remarkable that Professor Pillinger got as far as he did. He had the vision which, arguably, the European Space Agency lacked. And it's worth remembering that had Beagle 2 been successful, which it very nearly was, we would be feting Professor Pillinger as a hero, rather than discussing the nuances of critical reports.

In the absence of any glaring error of judgement or incompetence, it is unwise to indulge in looking for a scapegoat – especially in an area as fraught and technically demanding as space travel. Another important part of the learning process is that set backs cannot be used as an excuse for giving up. Professor Pillinger should be given the green light to begin work on the next mission to Mars as soon as possible.

PUBLICO

Rubrique :

Page : 39

1 / 2



Estudantes universitários constroem micro-satélites

**PROJECTO ENVOLVE
21 UNIVERSIDADES**

No Porto e em Lisboa, 47 alunos de cursos de engenharia preparam o lançamento de dois micro-satélites, para lançar em 2006, num projecto apoiado pela ESA.

TIAGO REIS

Tudo começou em 2001, na forma do sonho de um aluno do terceiro ano de Engenharia Mecânica da Faculdade de Engenharia da Universidade do Porto (FEUP). O nome do aluno era Pedro Portela e o sonho chamava-se SSETI, ou melhor, "Student Space Exploration and Technology Initiative", a designação de um projecto iniciado em 2000 pelos serviços de educação da Agência Espacial Europeia (ESA). Envolve estudantes de 21 universidades europeias num programa de cooperação espacial que inclui o desenvolvimento de micro-satélites e, posteriormente, de sondas e exploradores lunares.

Foi assim que se formou a equipa de estruturas do SETTI na Porto, que hoje é composta por sete alunos e que, desde 2001, coopera na construção do primeiro micro-satélite do projecto — o ESEO (European Student Orbit). O trabalho está

a dar frutos num pequeno compartimento com dois computadores no Departamento de Engenharia Mecânica da FEUP.

A equipa portuguesa está também a trabalhar na construção de um segundo satélite — o SSETI Express —, com lançamento previsto para Maio do próximo ano e que servirá como teste para o ESEO, que deverá estar em órbita no início de 2006, adiantou António Melro, actual coordenador da equipa. "Dimensionar e calcular a estrutura dos satélites e escolher os materiais adequados, de modo a que possa sobreviver a um lançamento, em que há uma série de cargas acústicas e de vibrações" é a missão da equipa portuguesa, que inclui ainda 40 alunos de três universidades de Lisboa, explicou.

O trabalho passa, fundamentalmente, pelo cálculo matemático e simulação do comportamento dos satélites, o que é bem visível pelo emaranhado de linhas e números que enchem o monitor de um dos computadores do gabinete.

Não é de estranhar a necessidade de um contacto permanente entre a ESA e as equipas do SETTI, que ganha ainda mais força pelo facto de cada uma estar a trabalhar em diferentes

subsistemas do satélite, num modelo de "desenvolvimento distribuído". "Usamos muito os 'chats' da Internet, e todas as semanas há reuniões com as equipas e com a ESA, nas quais trocamos impressões e procuramos resolver problemas em conjunto." Duas vezes por ano, há um 'workshop' em que alunos de cada equipa vão à Holanda, durante uma semana, para trocar ideias. "É nessa altura que o trabalho é avaliado", acrescenta António Melro. Para as dúvidas mais imediatas, cada equipa conta ainda com a ajuda de um professor — missão que, no Porto, cabe a Pedro Camanho.

Este projecto permite aos alunos começarem a ter contacto com tecnologias avançadas, antes de terminar o curso. "Isto num trabalho que inclui conceitos que só são estudados no último ano ou mesmo em pós-graduações", diz Pedro Camanho, numa conversa feita com o ruído de fundo das várias experiências espalhadas pelo laboratório do departamento de Engenharia Mecânica.

Muitos são os alunos que poderão ainda passar por esta experiência, porque o projecto SSETI está longe de estar concluído. O aluno que iniciou a ideia, Pedro

Portela, continua aliás a colaborar no projecto. António Melro, que entrou a bordo há cerca de um ano, realça a necessidade de "um trabalho de continuação e de aperfeiçoamento realizado pelas várias gerações de alunos."

"Seria uma grande vitória conseguirmos provar que há muitos interessados em engenharia espacial", através de um trabalho que "pode ser uma rampa de lançamento para os alunos poderem trabalhar outros projecto da ESA ou trabalhar mesmo na ESA", acrescenta António Melro, ao falar sobre a falta de cursos de engenharia espacial em Portugal.

Sendo assim, qual é o limite para estes jovens estudantes? "O limite é a Lua", refere um entusiasmado António Melro. "Para já, vamos pôr os satélites em órbita da Terra, depois queremos pô-los na órbita lunar. Numa terceira fase, lá para 2010, queremos então aterrissar na lua com um pequeno robô, semelhante aos usados agora em Marte."

Sonhos e ambições para acompanhar nos próximos tempos, junto de uma equipa de jovens que prometem levar o nome de Portugal a todos os cantos do Universo.

PUBLICO

Rubrique :

Page : 39

2 / 2

Satélites do tamanho de uma máquina de lavar louça

O que são os micro-satélites (MS)?

Os micro-satélites desenvolvidos no âmbito do projecto SSETI são pequenos satélites que têm mais ou menos as dimensões de uma máquina de lavar louça, com um peso máximo de 120 quilos. A sua utilidade centra-se em pequenas experiências científicas, como a medição do plasma solar, a realização de testes a alguns componentes, como sistemas de propulsão.

O que é o ESEO?

O ESEO é o principal projecto a ser desenvolvido no âmbito do SSETI. A missão deste satélite será usar em pleno o sistema de propulsão testado no SSETI Express, assim como desenvolver uma experiência de medição do plasma solar e fotografar a Europa. Espera-se que permaneça em órbita cerca de dois meses, numa posição geostacionária. No futuro, satélites semelhantes

poderão vir a desempenhar missões na Lua.

O que é o SSETI Express?

Com lançamento previsto para Maio de 2005, funciona como uma espécie de teste antes do lançamento do ESEO. Levará ainda três satélites ainda mais pequenos, concebidos em universidades da Dinamarca, Noruega e do Canadá.

Quanto custa todo o processo de construção dos MS?

Em relação ao ESEO, ainda são desconhecidos os valores, mas deverá ser bastante mais caro do que o SSETI Express. Neste projecto, só o lançamento custa 800 mil euros, valor que pode ascender ao milhão de euros se lhe adicionarmos os trabalhos de produção e construção. Os custos estão a cargo da ESA, que conta com a cooperação das várias universidades, responsáveis por dar apoio logístico às várias equipas. T.R

PUBLICO

Rubrique :

Page : 35

1 / 1



Galáxias distantes fornecem mais provas sobre a energia negra

Observações feitas pelo telescópio espacial Chandra revelam que o Universo está a acelerar

GUY GUGLIOTTA

A observação de 26 aglomerados de galáxias pelo telescópio espacial Chandra, da NASA, permitiu recolher novas provas da existência da energia negra — uma misteriosa força repulsiva, de efeito oposto ao da gravidade, e que estará a acelerar a expansão do Universo.

Os dados revelados pela NASA, em conferência de imprensa, vão ao encontro de descobertas anteriores, que apontavam para que a energia negra fosse aquilo a que Albert Einstein chamou “a constante cosmológica” — uma expansão gradual e possível de prever do Universo, que resultará numa solidão de proporções cósmicas, daqui a uns 100 mil milhões de anos, quando as galáxias estiverem tão distantes umas das outras que os céus parecerão estar vazios.

O Chandra, que obtém imagens da radiação X do espectro electromagnético, observou aglomerados de galáxias que ficam a distâncias entre 1000 milhões e 8000 milhões de anos-luz de distância da Terra. Analisando os raios X emitidos pelos gases quentes dessas galáxias, os cientistas conseguiram calcular a que distância estavam da Terra e a que velocidade se moviam.

“As galáxias estavam muito mais distantes do que deveriam estar”, comentou Steven Allen, da Universidade de Cambridge (Reino Unido) e líder da equipa. A diferença é causada pela energia negra,

concluíram os astrofísicos.

“Temos provas claras e directas de que a expansão do Universo está a acelerar”, comentou. “Os nossos resultados são consistentes com a constante cosmológica, e têm implicações importantes para o destino do Universo.”

Durante décadas, os cientistas pensaram que a gravidade estava a desacelerar, gradualmente, a expansão do Universo, iniciada após

o Big Bang, há 13.700 milhões de anos. Isto resultaria num colapso do Cosmos — um Big Crunch, por oposição ao Big Bang.

Mas, em 1998, surgiram indícios de que, há 6000 milhões de anos, uma misteriosa força repulsiva — a energia negra — começou a contrariar a gravidade, fazendo acelerar a expansão do Universo. Trabalhos posteriores determinaram que a energia negra possa corresponder a 75 por cento do Universo.

Os dados obtidos com o Chandra confirmam a descoberta de 1998, mas não ajudam a explicar melhor o que está a acontecer. “À medida que forem sendo feitas novas observações, a margem de erro das teorias vai diminuir. Mas penso que, de momento, ainda estamos a uma distância relativamente longa de saber se encontrámos a constante cosmológica”, comentou o astrónomo Mario Livio, do Instituto de Ciência do Telescópio Espacial. “Pode até ser impossível virmos a sabê-lo.” ■ EXCLUSIVO PÚBLICO/“THE WASHINGTON POST”

PUBLICO

Rubrique :

Page : 34

1 / 1



Espaço Japonês será o próximo turista em órbita

O próximo turista a visitar a Estação Espacial Internacional vai ser um empresário japonês. O voo, a bordo de uma cápsula Soiuz russa, deverá realizar-se em 2005 ou 2006. Ainda não se sabe quem vai ser o turista. A empresa Space Adventures, que comercializa os voos turísticos espaciais, assinou um acordo com uma agência de publicidade de Tóquio para encontrar um patrocinador para pagar a viagem, em troca de publicidade à marca nas aparições do turista. O empresário norte-americano Greg Olson deverá realizar a viagem em Outubro. O primeiro turista a visitar a estação, em 2001 foi o milionário americano Dennis Tito, seguindo-se o sul-africano Mark Shuttleworth, em 2002.

PUBLICO

Rubrique :

Page : 34

1 / 1



EUA Primeiro astronauta chinês foi à ONU

O primeiro astronauta chinês, Yang Liwei, está nos EUA e visitou em Nova Iorque o secretário-geral das Nações Unidas, Kofi Annan, e ofereceu-lhe a bandeira da ONU, que o acompanhou durante a missão a bordo da cápsula Shenzhou, em Outubro passado. Kofi Annan congratulou a China e sublinhou que as Nações Unidas têm “um interesse muito grande pelo espaço, particularmente pelos usos pacíficos que pode ter.” Com a visita a Kofi Annan, o astronauta iniciou uma viagem de vários dias aos EUA. Na segunda-feira, Yang e a sua delegação, de que faz parte o embaixador de Pequim para as Nações Unidas, Wang Guangya, vão até ao Centro Espacial Kennedy, da NASA. O astronauta chinês vai ainda passar por Washington, Houston e Texas.

Rubrique :	Page : 10
Wissen	1 / 1

Zum Crash verdammt

Beagle-Projekt war schlecht geführt

Der Verlust der Mars-Sonde *Beagle 2* geht nach Ansicht der Europäischen Weltraumagentur Esa auf Management-Fehler zurück. Die Agentur hat gestern 19 Empfehlungen für künftige Missionen veröffentlicht. Sie beruhen auf einem Bericht, den der britische Wissenschaftsminister Lord Sainsbury und der Esa-Generaldirektor Jean-Jacques Dordain in Auftrag gegeben hatten. Der Bericht soll nicht veröffentlicht werden, doch lässt sich aus den Empfehlungen ablesen, zu welchen Schlüssen er gekommen ist. Besonders am Anfang war das *Beagle*-Projekt offenbar unterfinanziert, die zeitliche Planung war zu knapp, es fehlten ausreichende Tests entscheidender Komponenten wie der Fallschirme. Außerdem sei es ein Fehler gewesen, *Beagle 2* als ein „Instrument“ auf dem Orbiter *Mars Express* zu behandeln, anstatt ihm dem Status einer „Mission“ zu geben, die stärkeren internen Kontrollen unterliegt. Zukünftige planetare Missionen müssten außerdem ein Mindestmaß an Daten bei der Landung übermitteln und ein besseres Funksystem bekommen. Auch müsse sich die Planung für Fallschirme und Airbags an russischem und amerikanischem Know-how orientieren. Der britische „Beagle“-Chefwissenschaftler Colin Pillinger wies die Kritik zurück. Das Projekt sei nicht unterfinanziert gewesen und habe über die besten Leute und beste Technik verfügt. Die genaue Absturzursache von *Beagle 2* wird die Esa vermutlich niemals klären, sagte ihr Wissenschaftsdirektor David Southwood auf einer Pressekonferenz in London. „Aber man weiß ja nie, eines fernen Tages werden Europäer, die auf dem Mars herumlaufen, *Beagle* vielleicht finden.“ cris

Rubrique :

Page : 21

Forschung und Technik

1 / 1

Schlechtes Management war Schuld an gescheiterter Marsmission

Esa-Kommission suchte nach Gründen für „Beagle 2“-Fehlschlag

HANDELSBLATT, 25.5.2004

dpa LONDON. Schlechtes Management, zu wenig Geld und hoher Zeitdruck sind vermutlich Schuld am Scheitern des europäischen Marslandegerätes „Beagle 2“ im Dezember vergangenen Jahres. Zu diesem Ergebnis kam eine Untersuchungskommission der Europäischen Raumfahrtagentur (Esa) und dem Nationalen Britischen Weltraumzentrum (BNSC). Wie die BBC am Montag berichtete, sei die Veröffentlichung des Berichts nicht vorgesehen, jedoch gehe die Einschätzung über die möglichen Fehler aus Emp-

fehlungen der Kommission zu zukünftigen Projekten hervor.

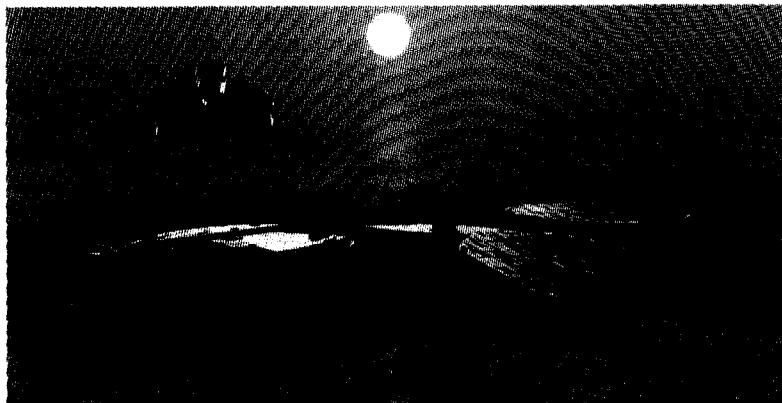
Nach den Angaben sei zu Beginn zu wenig Geld in das 75 Millionen Euro teure Projekt geflossen. Weil der Zeitdruck sehr hoch gewesen sei, seien nicht alle Komponenten vor dem Start ausreichend getestet worden, hieß es weiter. Dazu gehörten etwa die Luftkissen, die den Aufprall von „Beagle 2“ auf der Marsoberfläche abfedern sollten. Ebenso hätte die Funktionsfähigkeit der Fallschirme in größerer Höhe getestet werden müssen.

Was genau schief lief, ist jedoch

nach wie vor nicht bekannt, weil den Ermittlern bis heute keine Daten des verschollenen Landegerätes vorlagen. „Man weiß ja nie, eines fernen Tages werden Europäer, die auf dem Mars herumlaufen, „Beagle“ vielleicht finden“, sagte Esa-Wissenschaftsdirektor David Southwood.

Der britische „Beagle“-Chefwissenschaftler Colin Pillinger wies allerdings jede Kritik zurück. Das Projekt sei nicht unterfinanziert gewesen und habe über die besten Leute und die beste Technik verfügt. Nach Einschätzung internationaler Raumfahrtexperten ist das Landegerät möglicherweise auf der Marsoberfläche zerschellt. Grund dafür könnte sein, dass die Atmosphären-dichte auf dem Planeten geringer gewesen ist als von den Wissenschaftlern berechnet, hatte es geheißen. Damit habe sich die Sonde schneller als erwartet dem Boden genähert, Fallschirm und Airbags seien zu spät geöffnet worden.

Der „Beagle 2“ sollte auf dem Mars landen, ein ein Meter tiefes Loch in die Oberfläche graben und das Gestein nach Spuren von Wasser analysieren. Nachdem die Kontaktaufnahme mehrmals scheiterte, gab die Esa das Landegerät schließlich verloren.



Das Modell zeigt, wie die europäische Marssonde „Beagle 2“ hätte landen sollen. Der Roboter sollte die Oberfläche des roten Planeten erkunden.

THE WALL STREET JOURNAL EUROPE.

Rubrique :

Page : 1

1 / 1

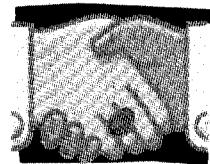
Satellite Consolidation Seems Ready for Liftoff

*Intelsat Shelves IPO Plans,
Opening the Door to Talks
With Circling Buyout Firms*

By ANDY PASZTOR
And DENNIS K. BERMAN

AFTER YEARS OF speculation about mergers and acquisitions in the commercial-satellite industry, private-equity investors are poised to turn consolidation dreams into reality.

The latest target is closely held Intelsat Ltd., the No. 2 global satellite-services provider,



**DEALS &
DEAL MAKERS**

which has formally opened the door to further discussions with buyout firms by shelving long-standing plans for an initial public offering in the U.S. Hoping to get a better

price, Intelsat took the step despite continuing U.S. congressional pressure to launch an IPO.

The development marks the growing impact of private-equity firms in reshaping the satellite world. Once seen as a stodgy, low-growth business weighed down by rigid licensing procedures and considerable technological risks, the satellite-services industry has emerged as one of the current darlings of private-equity groups. Leveraged-buyout specialists are attracted by hefty cash flows and long-term customer contracts, as well as

anticipated cost-savings and synergies from future combinations.

Led by some of the savviest, most-aggressive private-equity players on both sides of the Atlantic, financial investors in the past few years have pulled three large commercial-satellite fleets into their orbit. The latest move was Kohlberg Kravis & Roberts Co.'s winning \$3.55 billion (€2.97 billion) bid last month for PanAmSat Corp., the largest U.S.-based operator. The price reflects a heightened level of interest in satellite assets, as well as availability of low-cost financing.

Now KKR, and like-minded groups that already control European satellite-operators Eutelsat SA and Inmarsat Ltd., want to turn their gains into vehicles for further industry consolidation. At the same time, rivals who came up empty-handed in previous auctions hope to swoop in and snatch the remaining prizes for themselves.

Those likely to ponder further satellite moves include Apollo Management LP, Thomas H. Lee Partners LP, Bain Capital LLC, Carlyle Group LLC, Providence Equity Partners Inc. and Blackstone Group LP. All have studied the industry and tried to buy a chunk of it. Often, acquisitions are the only way for satellite interests to grab attractive orbital slots.

Private-equity interests "are buying into the industry because they're going to cut costs, consolidate and milk the cash flow," says Doug Sheres, a partner at Rice, Hall, James & Associates LLC, a \$2.5 billion investment-management firm that invested in PanAmSat last year.

Even before Intelsat's announcement, the flow of fresh money had caused industry leaders to consider new approaches to their business. The aim is to roll up the industry's hodgepodge of satellites,

or "birds," into efficient new flocks and the ultimate measure of success is maximizing returns in three to five years.

But the biggest fight is likely to be over Intelsat, based in Bermuda with headquarters in Washington, which reported revenue of more than \$950 million in 2003. In the end, regulatory hurdles and other issues could prompt a piecemeal sale of the company. That may be precisely what Lockheed Martin Corp., Intelsat's largest shareholder, wants in order to maximize the cash it stands to receive.

A satellite pioneer controlled by a consortium of more than 100 governments until 2001, Intelsat stumbled in seeking to expand from its core, low-margin telecommunications business to become a more nimble, market-oriented competitor. It has spent heavily on fleet expansion and lagged behind rivals in connecting satellites with fiber-optics on the ground to provide various services. "As an industry, we need to be better in reading the market," Conny Kullman, Intelsat's chief executive, told a conference earlier this year.

An equally receptive takeover target is Netherlands-based New Skies Satellites NV, whose stock has been particularly volatile lately as it negotiates a possible deal with at least two separate private-equity suitors, industry officials said. New Skies is generally considered too small to be a long-term survivor. With its emphasis on Internet-related services in India and other foreign markets, many on Wall Street believe it would be a good fit with PanAmSat's North American-focused video businesses. But industry officials said Blackstone also has expressed strong interest. New Skies, PanAmSat Kohlberg Kravis and Blackstone all declined to comment on future plans.

EL MUNDO

Rubrique :

Page : 35

1 / 1



La sonda 'Odyssey' ha orbitado 10.000 veces sobre Marte

WASHINGTON.- Relegada a segundo plano por el éxito de los exploradores *Spirit* y *Opportunity*, la sonda espacial *Odyssey* ha marcado un nuevo hito en el estudio de la superficie de Marte al completar 10.000 órbitas en torno al planeta rojo.

Lanzada desde Cabo Cañaveral el 7 de abril de 2001 para realizar un estudio cartográfico de Marte, la sonda espacial completó ayer lo que se pensó que sería una proeza virtualmente inalcanzable, informa Efe, sobre todo tras el fracaso de sus dos predecesoras. «Para los científicos, estas 10.000 órbitas son una hazaña», dijo Gaylon McSmith, director científico del proyecto.

Odyssey quedó desplazada de la atención científica a primeros de año, cuando *Spirit* y *Opportunity* confirmaron que el planeta albergó agua. Pero, además de servir de enlace con la Tierra, la sonda también ha buscado agua y ha analizado el ambiente de radiación del planeta para determinar cuál podría ser su efecto sobre el ser humano.

FOCUS

Rubrique :	Page : 110
Perspektiven	1 / 1

Raumfahrt privat

In Nevada startete die Civilian Space Exploration – eine Gruppe von privaten Raumfahrtenthusiasten – erstmals eine Rakete, die 100 Kilometer hoch und damit an den **Rand des Weltalls** flog. Nach einer Brennphase von 14 Sekunden erreichte das 6,5 Meter hohe Projektil innerhalb von drei Minuten den Gipelpunkt seiner Bahn. Der Start soll demonstrieren, dass auch Amateure Raumflüge unternehmen können.



SPACEFLIGHT NOW

Rubrique :	Pge : 1-2	
Article/Internet	1/2	

Starburst eye of a galaxy produces a cosmic shower

UNIVERSITY OF WISCONSIN-MADISON NEWS RELEASE

Posted: May 23, 2004

Combining images from orbiting and ground-based telescopes, an international team of astronomers has located the eye of a cosmic hurricane: the source of the one million mile-per-hour winds that shower intergalactic space from the galaxy M82.

Situated 10 million light years from our own galaxy, the Milky Way, M82 is one of the most studied objects in the sky. Known as a starburst galaxy for the intense, bright clusters of young stars at its heart, M82 is also characterized by massive jets of hot gas -- tens of thousands of light years long -- that blast into intergalactic space perpendicular to the starry plane of the galaxy.

Using images combined from the Hubble Space Telescope (HST) and the WIYN Telescope on Kitt Peak, Ariz., a team of astronomers from University College London and the University of Wisconsin-Madison has traced the origin of the galaxy's 'superwind' into the starburst heart of M82. The work shows that the wind is not a single entity, but is made up of multiple gas streams that expand at different rates to form a 'cosmic shower' of hot gas expelled from the starburst.

The galaxy's mighty winds, the astronomers say, were sparked by a near-miss collision with the neighboring giant spiral galaxy M81. That close encounter, according to University College London astronomer Linda Smith, set off an explosive burst of star formation.

"M82 shows intense star formation packed into dense clusters," says Smith. "This powers plumes of hot gas that extend for tens of thousands of light years above and below the disk of the galaxy. The jets of gas from this pulsating cosmic shower are traveling at more than a million miles an hour into intergalactic space."

The emphasis of the new work, according to UW-Madison astronomer Jay Gallagher, was on the powerful high-temperature winds of M82 and using the Hubble and WIYN observations in combination to view the galaxy in a new way. "The Hubble and the WIYN data give us a new overall view of the M82 superwind stretching from deep within the starburst into intergalactic space."

The challenge of the new observations lay in visualizing data covering enormous distances and a huge range in brightness, says Mark Westmoquette, a graduate student at University College London.

"We solved this by overlaying the sharp images from Hubble that cover the inner galaxy, where resolving key details is critical, on top of WIYN data that show the extended wind," Westmoquette explains. "This approach allowed us to connect inner and outer features with specific sites of star formation."

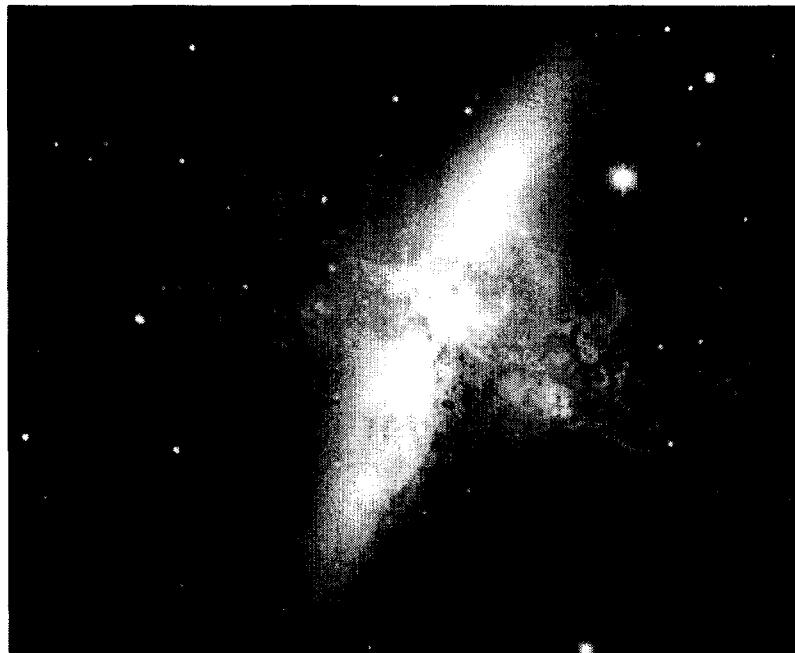
Westmoquette likened the exercise to tracing widely dispersed plumes of industrial smoke back to the smokestack from which it originated.

"Just as in the terrestrial case, understanding the flow of chemically enriched matter from galaxies into diffuse intergalactic space requires maps extending from the source to where the plume is lost," Westmoquette says. "It is a challenge for astronomers."

In addition to NASA's Hubble Space Telescope, data for the group's observations were obtained from the 3.5-meter WIYN Telescope at the Kitt Peak National Observatory in Arizona. The observatory is supported by the National Science Foundation and a consortium of American universities, including UW-Madison.

SPACEFLIGHT NOW

Rubrique :	Pge : 1-2
Article/Internet	2/2



Erreur! Signet non défini. The starburst galaxy M82 is one of the most studied objects in the sky. Now, an international team of astronomers, using data from the orbiting Hubble Space Telescope and the ground-based WIYN Telescope, have traced the source of the enigmatic, million mile per hour winds that shower the cosmos to the starburst heart of the galaxy. Credit: Mark Westmoquette, University College London; Jay Gallagher, UW-Madison; Linda Smith, University College London; WIYN/NSF; NASA/ESA

SPACEDAILY

Rubrique :	Pge : 1	
Article/Internet	1/1	

Seven Years To Saturn

Pasadena - May 24, 2004

As Cassini nears its rendezvous with Saturn, new detail in the banded clouds of the planet's atmosphere are becoming visible.

Cassini began the journey to the ringed world of Saturn nearly seven years ago and is now less than two months away from orbit insertion on June 30. Cassini's narrow-angle camera took this image on April 16, 2004, when the spacecraft was 38.5 million kilometers (23.9 million miles) from Saturn.

Dark regions are generally areas free of high clouds, and bright areas are places with high, thick clouds which shield the view of the darker areas below. A dark spot is visible at the south pole, which is remarkable to scientists because it is so small and centered.

The spot could be affected by Saturn's magnetic field, which is nearly aligned with the planet's rotation axis, unlike the magnetic fields of Jupiter and Earth. From south to north, other notable features are the two white spots just above the dark spot toward the right, and the large dark oblong-shaped feature that extends across the middle.

The darker band beneath the oblong-shaped feature has begun to show a lacy pattern of lighter-colored, high altitude clouds, indicative of turbulent atmospheric conditions.

The cloud bands move at different speeds, and their irregularities may be due to either the different motions between them or to disturbances below the visible cloud layer. Such disturbances might be powered by the planet's internal heat; Saturn radiates more energy than it receives from the Sun.

The moon Mimas (396 kilometers, 245 miles across) is visible to the left of the south pole. Saturn currently has 31 known moons. Since launch, 13 new moons have been discovered by ground-based telescopes. Cassini will get a closer look and may discover new moons, perhaps embedded within the planet's magnificent rings.

This image was taken using a filter sensitive to light near 727 nanometers, one of the near-infrared absorption bands of methane gas, which is one of the ingredients in Saturn's atmosphere. The image scale is approximately 231 kilometers (144 miles) per pixel. Contrast has been enhanced to aid visibility of features in the atmosphere. On May 18, Cassini officially entered the Saturn planetary system. This event marks when the gravitational pull of Saturn began to overtake the influence of the Sun and the probe crosses the outer limits of the most distant group of Saturnian moons, only weakly bound to Saturn and located tens of millions of kilometers from the planet.

The seven year voyage will end when Cassini's main engine is fired, the spacecraft is slowed, and the probe enters Saturn orbit on July 1, 2004.

Early next year, ESA's Huygens spaceprobe will be descending through the atmosphere of Saturn's largest moon (Titan), becoming the first spacecraft to land on a body in the outer Solar System. Titan is the only moon with a thick atmosphere.

Astronomers think this atmosphere might closely match the one Earth possessed millions of years ago, before life began. Certainly Titan's atmosphere is rich in carbon, the chemical necessary for life on Earth. What is more, this is all stored in 'deep freeze', ten times further from the Sun than the Earth.

The haze is much thicker than Earth's worst city smog. It was impenetrable to cameras aboard the Pioneer and Voyager spacecraft that flew by the Saturn system in the late 1970s and early 1980s.

The big mystery is Titan's surface, which is hidden by a cloud layer. This is why ESA built Huygens, to probe through this layer which is impenetrable by Earth-based observations. Huygens' battery of instruments will return over 1000 images as it floats down and samples the chemistry of this exotic place.

SPACE DAILY

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SMART-1 Finds Small Thrust Level Oscillations Help

Paris (ESA) May 24, 2004

The spacecraft is now flying its 288th orbit, in good status and with all functions performing nominally. The new thrusting strategy is well in progress with thrust arcs around perigee for about one third of every revolution. Presently the thrust arcs last for about 15 hours of every 42 hour-orbit. The thrust duration will progressively increase to almost 40 hours in orbit 321 in mid August when the orbital period will be more than 5 days. The ground control engineers monitor the electric propulsion system continuously by means of telemetry parameters like discharge current and other parameters of the thrust control loop. It was reported some time ago that oscillations were observed.

The engine manufacturer, SNECMA, investigated the problem and reported that although such behaviour was not considered dangerous, it was safer to avoid operating conditions where such control loop oscillations were present. To avoid these oscillations, the thruster power level was reduced to 1338W (previously at 1417W). This has a modest effect of about 200g on the fuel used, since reduced power levels imply a slightly higher Xe consumption. However, the better than expected electric propulsion efficiency and increased power availability meant that these small changes could be absorbed without mission impact.

During the last week, the flight dynamics team have measured some sudden jumps in the thrust level within a given thrust arc, of the order of 3%. Checking against ground tests, a correlation is seen between thruster anode oscillating current and thrust level, i.e. when we have high anode oscillating currents, we have lower thrust and vice versa.

This information is now being regularly analysed and passed to the flight dynamics team to ease their orbit determination solutions. This shows once more the importance of the SMART-1 mission in learning how to drive a solar electric propulsion mission.

Up to 5 May, the electric propulsion system had cumulated a total ON time of about 2160 hours, consumed about 34 kg of Xenon (41% of the total propellant on board) and imparted to the spacecraft a velocity increment of about 1560 ms⁻¹.